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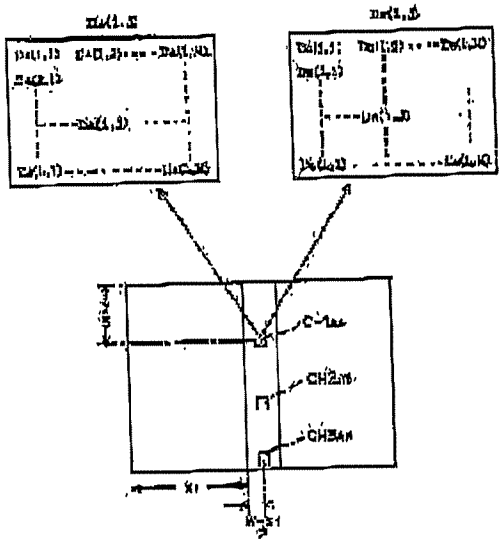

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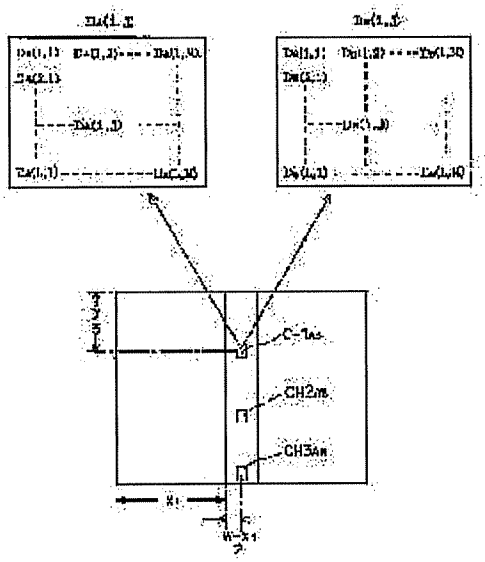
(54) **SYNTHESIS METHOD FOR TWO-DIMENSION IMAGE DATA**



(57)Abstract:
PROBLEM TO BE SOLVED: To synthesize pluralities of 2-dimension images read by a handy scanner without positional deviation automatically and without needing manual operation such as delicate dragging.
SOLUTION: Pluralities of check areas CH nearly at an equal interval in the direction Y are set around a middle of a part where reference image data and edit side image data are in duplicate in the direction X, and pixel data of the reference side check areas CH and pixel data at the edit side around them are compared. The edit side area where a total sum of differences of the pixel values is minimum through the comparison is used for an approximated area CH', it is moved in the direction X based on indication values Δx, Δy and a line number in the direction Y up to the position of the check area from an upper end is corrected. As to 2nd and succeeding check areas, an edit side image as the result of movement is used for a new edit side image and it is moved in the direction X based on indication values Δx, Δy and a line number in the direction Y up to the position of the preceding and this check areas.

CLAIMS

[Claim(s)]
[Claim 1] While arranging a handy scanner (1) on a photographic subject (5) and carrying out horizontal scanning of the one line of the direction of X, manual vertical scanning of the handy scanner (1) is carried out in the direction of Y. The image read operation which generates the 2-dimensional image data which consists of reading width of face of one line, and vertical-scanning width of face of the direction of Y, X directional movement actuation for which a handy scanner (1) is moved in the direction of X within reading width of face of at least one line is repeated. So that at least two or more 2-dimensional image data which a part of adjacent direction of X overlaps may be generated and the image data of the duplication section may be made in agreement In the synthetic approach of the 2-dimensional image data which edits 2-dimensional image data In the duplication section with the 2 edit

side-dimensional image data which adjoins 2 (b) criteria side-dimensional image data The multi-statement of the check area CH which consists of pixel data of an i line j train is carried out in the direction of Y on the basis of 2 criteria side-dimensional image data. The pixel data contained in the Kth check area CH (K) are extracted from 2 criteria side-dimensional image data as criteria pixel data D (i, j). (**) -- Centering on the Kth check area CH (K), the comparison area CHx and y of a predetermined number is set up in pitches [direction / of Y / X,]. (Ha) The pixel data contained in each comparison area CHx and y are extracted from 2 edit side-dimensional image data as comparison pixel data Dx and y (i, j). (**) -- The total quiet rates of concordance alphax and y of the difference of the pixel data with which each comparison pixel data Dx and y (i, j) and the criteria pixel data D (i, j) correspond are searched for. (**) -- The comparison area CHdeltax where the rates of concordance alphax and y become minimum rate-of-concordance alpha (K), and deltay are made into approximation area CH (K) '. (**) -- Calculate the edit indicated value deltax and delta y which moves approximation area CH (K) ' to the check area CH (K), and processing of (**) is repeated from (b) about the check area CH of all (g)s. The edit indicated value deltax and delta y is calculated for every check area CH. Based on the (h) edit indicated value deltax and delta y The synthetic approach of the 2-dimensional image data characterized by making the 2 edit side-dimensional image data containing approximation area CH' in agreement with the corresponding check area CH, editing, and compounding 2 criteria side-dimensional image data and 2 edit side-dimensional image data.

[Claim 2] While arranging a handy scanner (1) on a photographic subject (5) and carrying out horizontal scanning of the one line of the direction of X, manual vertical scanning of the handy scanner (1) is carried out in the direction of Y. The image read operation which generates the 2-dimensional image data which consists of reading width of face of one line, and vertical-scanning width of face of the direction of Y, X directional movement actuation for which a handy scanner (1) is moved in the direction of X within reading width of face of at least one line is repeated. So that at least two or more 2-dimensional image data which a part of adjacent direction of X overlaps may be generated and the image data of the duplication section may be made in agreement In the synthetic approach of the 2-dimensional image data which edits 2-dimensional image data (Li) In the duplication section with the 2 edit side-dimensional image data which adjoins 2 criteria side-dimensional image data The multi-statement of the check area CH which consists of pixel data of an i line j train is carried out in the direction of Y on the basis of 2 criteria side-dimensional image data. The pixel data contained in the Kth check area CH (K) are extracted from 2 criteria side-dimensional image data as criteria pixel data D (i, j). (**) -- Centering on the check area CH (K), the comparison area CHx and y of a

predetermined number is set up in pitches [direction / of Y / X,]. (**) -- The pixel data contained in each comparison area CHx and y are extracted from 2 edit side-dimensional image data as comparison pixel data Dx and y (i, j). (**) -- The total quiet rates of concordance alphax and y of the difference of the pixel data with which each comparison pixel data Dx and y (i, j) and the criteria pixel data D (i, j) correspond are searched for. (**) -- The comparison area CHdeltax where the rates of concordance alphax and y become minimum rate-of-concordance alpha (K), and deltay are made into approximation area CH (K) '. (Mosquito) The edit indicated value deltax and delta y which moves approximation area CH (K) ' to the check area CH (K) is calculated. (**), when the check area CH (K) is the 1st check area CH (1) from the upper limit of the duplication section edit -- indicated value -- delta -- y -- following -- edit -- a side -- two -- a dimension -- image data -- upper limit -- from -- approximation -- area -- CH -- (-- one --) -- ' -- up to -- Rhine -- a number -- amending -- a check -- area -- CH -- (-- one --) -- approximation -- area -- CH -- (-- one --) -- ' -- the same -- Rhine -- a top -- being in agreement -- making -- while -- the edit indicated value delta x -- following -- the 2 edit side-dimensional image data whole -- the direction of X -- moving -- editing -- (**), in being the check area CH of the 2nd henceforth (K) It is considered that the 2-dimensional image data edited in the last check area CH (K-1) is new 2 edit side-dimensional image data. a check -- area -- CH -- (-- K --) -- every -- the rate of concordance -- alpha -- (-- K --) -- edit -- indicated value -- delta -- x -- delta -- y -- asking -- (**) -- edit -- indicated value -- delta -- y -- following -- just before -- a check -- area -- CH (K-1) -- from -- approximation -- area -- CH -- (-- K --) -- ' -- up to -- Rhine -- a number -- amending -- while -- When rate-of-concordance [of the check area CH (K)] alpha (K) is minimum value alphaMIN (K) of all the check area CH (K) By moving the whole 2 edit side-dimensional image data in the direction of X, and repeating (**) processing according to the edit indicated value delta x The synthetic approach of the 2-dimensional image data characterized by editing 2 edit side-dimensional image data about all the check area CH (K), and compounding 2 criteria side-dimensional image data and 2 edit side-dimensional image data.

[Claim 3] (**) In case the 2 edit side-dimensional image data which laps in the duplication section is edited, edit all the 2-dimensional image data that stands in a row through other duplication sections in the direction of 2 edit side-dimensional image data with 2 edit side-dimensional image data. (**), after compounding 2 criteria side-dimensional image data and 2 edit side-dimensional image data The processing which makes 2 edit side-dimensional image data new 2 criteria side-dimensional image data, and makes the 2-dimensional image data which continues through other duplication sections new 2 edit side-dimensional image data (Thu) is repeated. The synthetic approach of 2-dimensional image data given in claim 1 characterized by compounding all the 2-dimensional image data

that three or more 2-dimensional image data follows in the two or more-(**) duplication section, or any 1 term of 2.
[Claim 4] (**) In case the 2 edit side-dimensional image data which laps in the duplication section is edited, edit all the 2-dimensional image data that stands in a row in the direction of 2 edit side-dimensional image data with 2 edit side-dimensional image data. After compounding 2 (**) criteria side-dimensional image data and 2 edit side-dimensional image data, Make 2 criteria side-dimensional image data into new 2 edit side-dimensional image data, and processing of (**) is repeated by making into new 2 criteria side-dimensional image data the 2-dimensional image data which stands in a row through other duplication sections in the direction of 2 criteria side-dimensional image data. The synthetic approach of 2-dimensional image data given in claim 1 characterized by compounding all the 2-dimensional image data that three or more 2-dimensional image data follows in the two or more-(c) duplication section, or any 1 term of 2.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the synthetic approach of the 2-dimensional image data which edits and compounds the duplication section about two or more 2-dimensional image data read by the handy scanner.
[0002]
[Description of the Prior Art] The handy scanner 1 which is a handicap type image scanner As shown in drawing 8 , it has the optical-system components and image sensor 4 of illumination lamp 3 grade in the housing 2 of the magnitude which can be operated single hand. A photographic subject (read image) 5 is illuminated with the illumination lamp 3, the reflected light is reflected by the mirror 7 through a slit, image formation is carried out to the image sensors 4, such as a CCD line sensor, through a lens 8, horizontal scanning of the one line of an image formation image is carried out with the image sensor 4, and it changes into an electrical signal.
[0003] And if a handy scanner 1 is moved in the direction of Y, rolling the direction roller 9 of Y on a photographic subject 5, the migration length of the direction of Y will be detected by the rotary encoder 10 interlocked with the direction roller 9 of Y. And 2-dimensional image data is obtained by the main actuation of the reading width of face w for one line of the direction of X, and manual vertical scanning to the direction of Y.

[0004] Further, this handy scanner 1 is equipped with the rotary encoder 12 interlocked with the direction roller 11 of X which intersects perpendicularly with the direction roller 9 of Y, and the direction roller 11 of X, in order to read the photographic subject 5 more than the reading width of face w for one line. that is, it is shown in drawing 9 -- as -- the photographic subject 5 more than the reading width of face w -- receiving -- above -- a handy scanner 1 -- Y1' -- making a handy scanner 1 incline and floating the direction roller 9 of Y from a photographic subject, after carrying out manual vertical scanning, the direction roller 11 of X is rolled and it moves in the direction of X.

[0005] Although the migration length of the direction of X at this time is detected by a rotary encoder and the photo interrupter 12, the read of a photographic subject 5 does not carry out. distance X1' which does not exceed the reading width of face w in the direction of X -- after making it move, the direction roller 9 of Y is again contacted for a photographic subject 5, and manual vertical scanning of distance Y2' is performed in horizontal scanning and the direction of Y of [for one line]. On the occasion of subactuation of this direction of Y, the direction roller 11 of X lost touch with a photographic subject, and has suspended that rotation at it.

[0006] If the above-mentioned actuation is repeated until it moves a handy scanner 1 in the direction of X, and the direction of Y similarly (they are X2' and Y3' at drawing 9) and reads all the photographic subjects 5 hereafter, since the migration length of the direction of X and the direction of Y and a direction (forward and negative) are detected, two or more two-dimensional image data which a part of adjacent direction of X overlaps can be obtained.

[0007]

[Problem(s) to be Solved by the Invention] According to the above-mentioned conventional handy scanner 1, although the photographic subject 5 of the magnitude more than reading width of face w of one line can be read by a series of actuation, in case a handy scanner 1 is made to incline, the drive timing of rotary encoders 10 and 12 may shift, or an error may arise in the migration length which X, the direction rollers 9 and 11 of Y, and the space of a photographic subject 5 may start sliding contact, and detected with the migration length on a photographic subject 5.

[0008] Thus, if an error arises in migration length, a location gap can arise between the 2-dimensional image data A and B and between B and C, and the 2-dimensional image data read correctly cannot be made to continue like drawing 10 .

[0009] Then, two or more read 2-dimensional image data is displayed on a display etc., and he edits the 2-dimensional image data which the location gap produced by manual operation, and is trying to continue mutually conventionally. That is, two pixels 13B and 14B are extracted to arbitration out of the duplication section of one 2 edit side-dimensional

image data (for example, inside B of drawing), and by drag actuation of a mouse etc., the whole 2 edit side-dimensional image data is moved so that it may be in agreement with the pixels 13A and 14A to which 2 criteria side-dimensional image data (for example, inside A of drawing) corresponds, and both are compounded.

[0010] However, when it was a slight location gap, checking on a display, minute migration of the pixels 13B and 14B extracted by actuation of a drag etc. was carried out, and things were difficult activities.

[0011] Moreover, in each duplication section of two or more 2-dimensional image data, the above-mentioned editing task needed to be performed and composition was troublesome.

[0012] This invention aims at offering the synthetic approach of the 2-dimensional image data which compounds two or more 2-dimensional image data without a location gap, without performing the editing task by manual operation.

[0013]

[Means for Solving the Problem] In order to attain the above-mentioned purpose the synthetic approach of the 2-dimensional image data of claim 1 The image read operation which generates the 2-dimensional image data which arranges a handy scanner on a photographic subject, carries out manual vertical scanning of the handy scanner in the direction of Y while carrying out horizontal scanning of the one line of the direction of X, and consists of reading width of face of one line, and vertical-scanning width of face of the direction of Y, X directional movement actuation for which a handy scanner is moved in the direction of X within reading width of face of at least one line is repeated. So that at least two or more 2-dimensional image data which a part of adjacent direction of X overlaps may be generated and the image data of the duplication section may be made in agreement In the synthetic approach of the 2-dimensional image data which edits 2-dimensional image data In the duplication section with the 2 edit side-dimensional image data which adjoins 2 (b) criteria side-dimensional image data The multi-statement of the check area CH which consists of pixel data of an i line j train is carried out in the direction of Y on the basis of 2 criteria side-dimensional image data. The pixel data contained in the Kth check area CH (K) are extracted from 2 criteria side-dimensional image data as criteria pixel data D (i, j). (**) -- Centering on the Kth check area CH (K), the comparison area CHx and y of a predetermined number is set up in pitches [direction / of Y / X,]. (Ha) The pixel data contained in each comparison area CHx and y are extracted from 2 edit side-dimensional image data as comparison pixel data Dx and y (i, j). (**) -- The total quiet rates of concordance alphax and y of the difference of the pixel data with which each comparison pixel data Dx and y (i, j) and the criteria pixel data D (i, j) correspond are searched for. (**) -- The comparison area CHdeltax where the rates of concordance alphax and y become minimum rate-of-concordance alpha (K), and deltay are made into approximation

area CH (K) '. (**) -- Calculate the edit indicated value deltax and delta y which moves approximation area CH (K) ' to the check area CH (K), and processing of (**) is repeated from (b) about the check area CH of all (g)s. The edit indicated value deltax and delta y is calculated for every check area CH. Based on the (h) edit indicated value deltax and delta y The 2 edit side-dimensional image data containing approximation area CH' is made in agreement with the corresponding check area CH, and it edits, and is characterized by compounding 2 criteria side-dimensional image data and 2 edit side-dimensional image data.

[0014] The 2 edit side-dimensional image data enclosed by approximation area CH (K) ' can be presumed to be what approximates to the 2 criteria side-dimensional image data enclosed in the check area CH (K) most in the perimeter, and the location gap produced between approximation area CH (K) ' and the check area CH (K). therefore, about all the check area CH (K) set as the duplication section Make the relative position of approximation area CH (K) ' to the check area CH (K) into the edit indicated value deltax and delta y, and only the edit indicated value deltax and delta y moves the 2 edit side-dimensional image data containing approximation area CH (K) '. If it is made in agreement with the check area CH (K), the 2-dimensional image data by the side of criteria and edit is automatically compoundable without a location gap.

[0015] Moreover, the synthetic approach of the 2-dimensional image data of claim 2 While arranging a handy scanner on a photographic subject and carrying out horizontal scanning of the one line of the direction of X, manual vertical scanning of the handy scanner is carried out in the direction of Y. The image read operation which generates the 2-dimensional image data which consists of reading width of face of one line, and vertical-scanning width of face of the direction of Y, X directional movement actuation for which a handy scanner is moved in the direction of X within reading width of face of at least one line is repeated. So that at least two or more 2-dimensional image data which a part of adjacent direction of X overlaps may be generated and the image data of the duplication section may be made in agreement In the synthetic approach of the 2-dimensional image data which edits 2-dimensional image data (Li) In the duplication section with the 2 edit side-dimensional image data which adjoins 2 criteria side-dimensional image data The multi-statement of the check area CH which consists of pixel data of an i line j train is carried out in the direction of Y on the basis of 2 criteria side-dimensional image data. The pixel data contained in the Kth check area CH (K) are extracted from 2 criteria side-dimensional image data as criteria pixel data D (i, j). (**) -- Centering on the check area CH (K), the comparison area CHx and y of a predetermined number is set up in pitches [direction / of Y / X,]. (**) -- The pixel data contained in each comparison area CHx and y are extracted from 2 edit side-dimensional image data as comparison pixel data Dx and y (i, j). (**) -- The total quiet rates of concordance alphax

and y of the difference of the pixel data with which each comparison pixel data Dx and y (i, j) and the criteria pixel data D (i, j) correspond are searched for. (**) -- The comparison area CHdeltax where the rates of concordance alphax and y become minimum rate-of-concordance alpha (K), and deltay are made into approximation area CH (K) '. (Mosquito) The edit indicated value deltax and delta y which moves approximation area CH (K) ' to the check area CH (K) is calculated. (**), when the check area CH (K) is the 1st check area CH (1) from the upper limit of the duplication section edit -- indicated value -- delta -- y -- following -- edit -- a side -- two -- a dimension -- image data -- upper limit -- from -- approximation -- area -- CH -- (-- one --) -- ' -- up to -- Rhine -- a number -- amending -- a check -- area -- CH -- (-- one --) -- approximation -- area -- CH -- (-- one --) -- ' -- the same -- Rhine -- a top -- being in agreement -- making -- while -- the edit indicated value delta x -- following -- the 2 edit side-dimensional image data whole -- the direction of X -- moving -- editing -- (**), in being the check area CH of the 2nd henceforth (K) It is considered that the 2-dimensional image data edited in the last check area CH (K-1) is new 2 edit side-dimensional image data. a check -- area -- CH -- (-- K --) -- every -- the rate of concordance -- alpha -- (-- K --) -- edit -- indicated value -- delta -- x -- delta -- y -- asking -- (**) -- edit -- indicated value -- delta -- y -- following -- just before -- a check -- area -- CH (K-1) -- from -- approximation -- area -- CH -- (-- K --) -- ' -- up to -- Rhine -- a number -- amending -- while -- When rate-of-concordance [of the check area CH (K)] alpha (K) is minimum value alphaMIN (K) of all the check area CH (K) By moving the whole 2 edit side-dimensional image data in the direction of X, and repeating (**) processing according to the edit indicated value delta x Two edit side-dimensional image data is edited about all the check area CH (K), and it is characterized by compounding 2 criteria side-dimensional image data and 2 edit side-dimensional image data.

[0016] The 2 edit side-dimensional image data enclosed by approximation area CH (K) ' can be presumed to be what approximates to the 2 criteria side-dimensional image data enclosed in the check area CH (K) most in the perimeter, and the location gap produced between approximation area CH (K) ' and the check area CH (K).

[0017] Since the relative position of approximation area CH (K) ' to the check area CH (K) is made into the edit indicated value deltax and delta y, only edit indicated-value deltay moves approximation area CH (K) ' and the moved number of Rhine is amended, the number of Rhine between the check area CH of the 2-dimensional image data by the side of criteria and edit (K) can be made in agreement.

[0018] When rate-of-concordance [of the check area CH (K)] alpha (K) is the minimum value of all the check area CH (K) Since it can presume that the rate of concordance of approximation area CH (K) ' and the check area CH (K) is the highest It can adjust to the location approximated most, losing a location gap of the direction of X between

the check area CH (K) by moving the whole 2 edit side-dimensional image data in the direction of X according to the edit indicated value delta x at that time.

[0019] About the check area CH of the 2nd henceforth (K), since it considers that the 2-dimensional image data edited in the last check area CH (K-1) is new 2 edit side-dimensional image data, the location gaps with new 2 edit side-dimensional image data and 2 criteria side-dimensional image data are fewer things. Therefore, the difference of the pixel data of the comparison pixel data Dx and y (i, j) and the criteria pixel data D (i, j) serves as a small value, and count of the rates of concordance alphax and y becomes easy.

[0020] Moreover, the synthetic approach of the 2-dimensional image data of claim 3 In case the 2 edit side-dimensional image data which laps in the duplication section is edited, all the 2-dimensional image data that stands in a row through other duplication sections in the direction of 2 edit side-dimensional image data is edited with 2 edit side-dimensional image data. (Thu) (**), after compounding 2 criteria side-dimensional image data and 2 edit side-dimensional image data The processing which makes 2 edit side-dimensional image data new 2 criteria side-dimensional image data, and makes the 2-dimensional image data which continues through other duplication sections new 2 edit side-dimensional image data (Thu) is repeated. It is characterized by compounding all the 2-dimensional image data that three or more 2-dimensional image data follows in the two or more-(**) duplication section.

[0021] Since all the 2-dimensional image data that stands in a row in the direction of 2 edit side-dimensional image data is edited into coincidence in case 2 edit side-dimensional image data is edited, the relative position between these does not change. Therefore, by said edit, the location gap between the 2-dimensional image data which continues through other duplication sections is not expanded, and count of the rates of concordance alphax and y does not become complicated.

[0022] Moreover, the synthetic approach of the 2-dimensional image data of claim 4 In case the 2 edit side-dimensional image data which laps in the (**) duplication section is edited, all the 2-dimensional image data that stands in a row in the direction of 2 edit side-dimensional image data is edited with 2 edit side-dimensional image data. After compounding 2 (**) criteria side-dimensional image data and 2 edit side-dimensional image data, Make 2 criteria side-dimensional image data into new 2 edit side-dimensional image data, and processing of (**) is repeated by making into new 2 criteria side-dimensional image data the 2-dimensional image data which stands in a row through other duplication sections in the direction of 2 criteria side-dimensional image data. It is characterized by compounding all the 2-dimensional image data that three or more 2-dimensional image data follows in the two or more-(c) duplication section.

[0023] Since 2 criteria side-dimensional image data is made into new 2 edit side-dimensional image data and the 2-dimensional image data which is not edited [which stood in a row in 2 criteria side-dimensional image data] is made into new 2 criteria side-dimensional image data after compounding 2 criteria side-dimensional image data and 2 edit side-dimensional image data, even if it repeats the editing task in two or more duplication sections, 2 edit side-dimensional image data can always be compared with non-edited criteria side image data. Therefore, while compounding between two or more 2-dimensional image data without a location gap, composition of the duplication section is compoundable where a photographic subject is resembled.

[0024]

[Embodiment of the Invention] Hereafter, with reference to drawing 1 thru/or drawing 6 , the synthetic approach of the 2-dimensional image data concerning the gestalt of operation of the 1st of this invention is explained.

[0025] Drawing 1 normalizes the 2-dimensional image data which shows three kinds of 2-dimensional image data A, B, and C which it is going to compound, and is shown in drawing 10 , before carrying out synthetic processing. That is, the upper and lower sides of the direction of Y of the 2-dimensional image data (a drawing destructive line shows) read, respectively are doubled with the shortest 2-dimensional image data, and Y lay length is arranged with Y.

[0026] Like drawing 1 , although the 2-dimensional image data A, B, and C stands in a row in the direction of X in the two duplication sections, with the gestalt of this operation, first, it makes 2 criteria side-dimensional image data and 2-dimensional image data B 2 edit side-dimensional image data for 2-dimensional image data A, and compounds both.

[0027] Two criteria side-dimensional image data A and 2 edit side-dimensional image data B lap in the duplication section OAB, and set three check area CH1AB(s), CH2AB, and CH3AB as this duplication section OAB. It is set up so that the core may be the middle of the direction of X of the duplication section OAB and each check area CH (K) may be mostly located in the direction of Y at equal intervals including the pixel data D of a L line M train (i, j). for example, check area CH1AB -- drawing 1 -- like -- criteria [A / 2 criteria side-dimensional image data] -- carrying out -- the direction of X -- in the location of [X1+ (w-X1)/2], from upper limit, check area CH2AB is set as the location of 2Y/3 from upper limit in the same location of the direction of X, and check area CH3AB is set as the location of Y/3 in the same location of the direction of X in the location near the lower limit. Moreover, it is similarly on the Y-axis of [X1+X2+ (w-X2)/2] about check area CH1BC which is set as the duplication section OBC and which is mentioned later, CH2BC, and CH3BC, and is set as the location Y / 2Y [3 and]/3, and near the lower limit from upper limit, respectively.

[0028] As shown in drawing 2 , 2 criteria side-dimensional image data A of the part with which it is expressed by check area CH1AB of the duplication section OAB is the criteria pixel data DA (i, j) which consist of pixel data of a L line M train, and the same 2 edit side-dimensional image data B of a part is the comparison pixel data DB (i, j) which consist of pixel data of a L line M train.

[0029] If there is no location gap between 2 criteria side-dimensional image data A and 2 edit side-dimensional image data B, the criteria pixel data DA (i, j) and the comparison pixel data DB (i, j) are the same. It is

$$\alpha = \sum_{j=1}^{M} \sum_{i=1}^{L} \{|DA_{R(i,j)} - DB_{R(i,j)}| + |DA_{G(i,j)} - DB_{G(i,j)}| + |DA_{B(i,j)} - DB_{B(i,j)}|\}$$

nding pixel data [0030]

[0031] since -- if it asks, alpha will become an index showing the rate of concordance of the image of the criteria pixel data DA (i, j) and the comparison pixel data DB (i, j), and it will be set to 0 if completely the same.

[0032] Each pixel data consists of 24 bit data which express the colour information of 1dot and expressed three primary colors each of RGB with 8 bit data. In DAR(i, j)-DBR (i, j), in the above and several 1, DAG(i, j)-DBG (i, j) asks the difference of G component for the difference of DAB(i, j)-DBB (i, j) for the difference of R component, respectively.

[0033] When the location gap has arisen between 2-dimensional image data A and B, the image equivalent to the criteria pixel data DA (i, j) is moving to the perimeter of check area CH1AB in the 2 edit side-dimensional image data B side. Therefore, much comparison area CHx and y (i, j) where only the minute distance of x and y was able to shift the core is set up in the direction of X, and the direction of Y focusing on check area CH1AB. The rates of concordance alphax and y of the comparison pixel data DBx and y (i, j) and the criteria pixel data DA (i, j) which are contained in each comparison area CHx and y (i, j) are searched for by several 1. The pixel data of an image which moved the comparison pixel data DBx and y (i, j) with which the value turns into the minimum value from check area CH1AB are presumed.

[0034] In order to search for the rates of concordance alphax and y by several one, the comparison area CHx and y (i, j) is the magnitude containing the pixel data of the same L*M individual as check area CH1AB, and 121 comparison area CHx and y (i, j) centering on the crossover location of x and y shown in drawing 3 is set up with the gestalt of this operation. As for the direction of x and y, in accordance with X and the direction of Y, the pitch between each crossover location serves as 5-pixel (5dot) spacing. Since the comparison area CHx and y (i, j) is set up in [of 25dot(s)] 5dot*5 vertically and horizontally focusing on 8 dot(s)/mm, then check area CH1AB, the resolution of a handy scanner 1 is detectable to a 3.125mm location gap.

[0035] As shown in drawing 3 , the rates of concordance alphax and y of

the comparison pixel data DBx and y (i, j) and the criteria pixel data DA (i, j) which are contained in this comparison area CHx and y (i, j) about 121 comparison area CHx and y (i, j) in the direction which separates one by one are searched for by several 1 from the core of check area CH1AB.

[0036] In the comparison area CHx1 and y1 (i, j) shown with the broken line set as that result 1, for example, x=x, and y=y1, supposing the rate of concordance alphax1 and y1 become the minimum value, that in which the image of check area CH1AB carried out the location gap can be presumed in the comparison area CHx1 and y1 (i, j) at this time. Therefore, make comparison area CHx1 and y1 (i, j) into approximation area CH1', and let the amounts x1 and y1 of bias to check area CH1AB of approximation area CH1' be the edit indicated value x1 and y1 which makes both in agreement. Moreover, the rate of concordance alphax1 used as this minimum value and y1 are set to rate-of-concordance [of check area CH1AB] alpha (1).

[0037] All the 2-dimensional image data C and D that stands the edit indicated value x1 and y1 in a row in the 2 edit side-dimensional image data B side collectively about check area CH1AB although 2 edit side-dimensional image data B is edited ** ** and based on these edit indicated value x1 and y1 is edited. Hereafter, drawing 4 and drawing 5 explain this editing task.

[0038] Edit of the direction of Y is performed based on the edit indicated value y1. When y1 is a forward value, approximation area CH1' is moved in the direction of -Y y1, and it considers as the same Rhine top as check area CH1AB. For this reason, as shown in drawing 4 , Rhine n for y1 movement magnitude is added. Since check area CH1AB is the 1st check area CH (K) from the upper limit of the duplication section OAB, Rhine n to fill up is added to 2 edit side-dimensional image data B from upper limit to approximation area CH1' in pitches [direction / of Y]. He is trying for filled-up Rhine n not to form a unique image as the pixel data as the pixel data of one of the upper and lower sides with the filled-up same pixel data of Rhine n. As a result of filling up Rhine n, downward 2 edit side-dimensional image data B moves in the direction (method of drawing Nakashita) of -Y y1 from approximation area CH1'.

[0039] Edit of the direction of X is performed based on the edit indicated value x1. When x1 is a forward value, approximation area CH1' is moved in the direction of -X (left in drawing) xone, and it is made in agreement with check area CH1AB. For this reason, as shown in drawing 4 , the whole 2 edit side-dimensional image data B is moved in the direction of -X xone.

[0040] As shown in drawing 5 (a), editing operation by the above edit indicated value x1 and y1 is performed also about all the 2-dimensional image data C and D that stands in a row in coincidence at the 2 edit side-dimensional image data B side. Namely, the 2-dimensional image data C and D from upper limit to a horizontal position equal to approximation area CH1' is supplemented with Rhine n, and

2-dimensional image data C and the whole D are moved in the direction of -X xone.

[0041] Thus, it holds in the condition of having read the relative position between 2-dimensional image data C which is not edited [2 edit side-dimensional image data B and] and D, by editing other 2-dimensional image data C and D into coincidence.

[0042] As a result of performing the editing task about check area CH1AB, the duplication section from upper limit to check area CH1AB is compounded without a location gap.

[0043] Subsequently, the same processing as **** is performed about the next check area CH2AB. Similarly, the rates of concordance alphax and y of the criteria pixel data DA of 2 criteria side-dimensional image data A contained in check area CH2AB (i, j) and the comparison pixel data DBx and y (i, j) of 2 edit side-dimensional image data B contained in the comparison area CHx and y (i, j) set as the perimeter are searched for by several 1.

[0044] As shown in drawing 6 , supposing rate-of-concordance alphax2 and y2 become the minimum value in the comparison area (approximation area CH2') shown with a broken line, edit indicated-value-x2 about check area CH2AB and -y2 will be calculated from the location to check area CH2AB of approximation area CH2' at this time. Moreover, rate-of-concordance alphax2 at this time and y2 are set to rate-of-concordance [of check area CH2AB] alpha (2), and are used in the case of edit of the direction of X mentioned later.

[0045] Edit indicated value - Since y2 is a negative value, like drawing 5 (b), it moves approximation area CH2' in the direction (method of drawing Nakagami) of +Y y2, and is taken as the same Rhine top as check area CH2AB. For this reason, as shown in this drawing, Rhine n' for y2 movement magnitude is deleted. a check -- area -- CH -- two -- AB -- duplication -- the section -- OAB -- upper limit -- from -- two -- a position -- a check -- area -- CH -- (-- K --) -- it is -- since -- drawing 4 -- like -- deleting -- Rhine -- n -- ' -- just before -- a check -- area -- CH -- (-- K --) -- namely, -- one -- a position -- a check -- area -- CH -- (-- one --) -- from -- approximation -- area -- CH -- two -- ' -- up to -- edit -- a side -- two -- a dimension -- image data -- B -- from -- etc. etc. -- it extracts in a pitch. He is trying for the read image not to change a lot by deleting Rhine n' to homogeneity (regular intervals). As shown in drawing, Rhine amendment of this direction of Y is performed like the edit in the above-mentioned check area CH (1) about other 2-dimensional image data C and D which stands in a row in the 2 edit side-dimensional image data B side, and the 2 edit side-dimensional image data B, C, and D which exists caudad from Rhine of approximation area CH2' by this moves in the direction of +Y y2 altogether.

[0046] It opts for edit of the direction of X about approximation area CH2' as compared with minimum rate-of-concordance alphaMIN (K) in rate-of-concordance [of the check area CH (K) which asked for

rate-of-concordance / of the check area CH (2) / alpha (2) by then] alpha (K). In this case, since it is rate-of-concordance [of the check area CH (1)] alpha (1), it compares with rate-of-concordance alpha (1), but minimum rate-of-concordance alphaMIN (K) does not perform edit of the direction of X, when rate-of-concordance alpha (2) is the value of a more more than [than rate-of-concordance alpha (1)]. That is, edit of the direction of X which followed the check area CH (K) concerning minimum rate-of-concordance alphaMIN (K) presumes that it was the edit for which the whole 2 edit side-dimensional image data B is moved to the location which is most in agreement with 2 criteria side-dimensional image data A in the direction of X.

[0047] As a result of performing the editing task about check area CH2AB, it is compounded that there is still no location gap of the duplication section OAB from check area CH1AB to check area CH2AB.

[0048] Same processing is performed about 3rd check area CH3AB, and it is [rate-of-concordance / of check area CH3AB / alpha (3), and] edit indicated value. - x3 and y3 are calculated.

[0049] Since the edit indicated value y3 is a forward value, like drawing 5 (c), it moves approximation area CH3' in the direction of -Y y3, and is doubled on the same Rhine as check area CH3AB. for this reason -- a check -- area -- CH -- one -- AB -- having followed -- ** -- the same -- just before -- a check -- area -- CH -- (-- K --) -- namely, -- two -- a position -- a check -- area -- CH -- (-- two --) -- from -- approximation -- area -- CH -- three -- ' -- up to -- edit -- a side -- two -- a dimension -- image data -- B -- and -- this -- standing in a row -- two -- a dimension -- image data -- C -- D -- pitches [direction / of Y] -- Rhine n for y3 movement magnitude -- supplying . As a result of filling up Rhine n, downward 2 edit side-dimensional image data B moves in the direction of -Y y3 from approximation area CH3'.

[0050] Then, as compared with minimum rate-of-concordance alphaMIN (K) in rate-of-concordance [of the check area CH (K) which asked for rate-of-concordance / of check area CH3AB / alpha (3) by then] alpha (K), it determines whether edit the direction of X about approximation area CH3'.

[0051] Minimum rate-of-concordance alphaMIN (K) will edit the direction of X by setting rate-of-concordance alpha (3) to new minimum rate-of-concordance alphaMIN (K), supposing rate-of-concordance alpha (3) is under alpha (1) about rate-of-concordance alpha (3) as compared with alpha (1), since it is alpha (1).

[0052] The edit indicated value of the direction of X is a negative value. - Since it is x3, whole 2-dimensional image data C and D which stand in a row in 2 edit side-dimensional image data B and this are moved in the direction of X xthree.

[0053] Thus, if 2 edit side-dimensional image data B is edited about all the check area CH (K) that the duplication section OAB set up, 2 criteria side-dimensional image data A of the duplication section OAB will be

compounded without a location gap.
[0054] Then, like the gestalt of this operation, when 2 more-dimensional image data is following the 2 edit side-dimensional image data B side, processing as stated above is repeated by setting to new 2 edit side-dimensional image data C 2-dimensional image data C which stands 2 edit side-dimensional image data B in a row through the duplication section OBC in new 2 criteria side-dimensional image data B and 2 edit side-dimensional image data B. That is, it is on the same shaft of the direction of Y, and check area CH1BC almost at equal intervals, CH2BC, and CH3BC are set up in the direction of Y, about each check area CH (K), much comparison area CHx and y (i, j) is similarly set as the duplication section OBC, and it is asked for rate-of-concordance alpha (K) and the edit indicated value deltax and delta y. However, it is not necessary to set up the number of the check area CH (K) to set up on the same Rhine as the check area CH (K) arbitrarily set up in other duplication sections for every duplication section.
[0055] From upper limit, supposing the rates of concordance about 1st check area CH1BC are alpha (1), the edit indicated value x4, and -y4 As shown in drawing 5 (d), it is edit indicated value. - Based on y4, it deletes from 2-dimensional image data D which stands in a row in 2 edit side-dimensional image data C from upper limit to approximation area CH1', and this in pitches [' / Rhine n], and downward image data is moved in the direction of Y y4 from approximation area CH1'. Moreover, based on the edit indicated value x4, the whole 2-dimensional image data D which stands in a row in 2 edit side-dimensional image data C and this is moved in the direction of -X. Rate-of-concordance [of check area CH1BC] alpha (1) is compared with rate-of-concordance [of the check area CH (K) called for after that] alpha (K) as minimum rate-of-concordance alphaMIN (K) in the duplication section OBC.
[0056] Thus, same edit can be performed about all the 2-dimensional image data that stands in a row in two or more duplication sections, and the 2-dimensional image data which does not have a location gap of an image in the mutual duplication section can be obtained.
[0057] In addition, with the gestalt of this operation, left end 2-dimensional image data A is first made into 2 criteria side-dimensional image data out of two or more 2-dimensional image data. what edits the 2 edit side-dimensional image data of the right-hand side while shifting 2 criteria side-dimensional image data to the method of the right one by one -- it was (it is called the edit side precedence mold right edit approach) -- Not necessarily 2-dimensional image data D of not only this approach but a right end may be shifted first, 2 criteria side-dimensional image data may be shifted to the left one by one as 2 criteria side-dimensional image data, and the 2 edit side-dimensional image data of that left-hand side may be edited (it is called the edit side precedence mold left edit approach).
[0058] Like previous statement, when these edit approaches are used to

many 2-dimensional image data, edit is repeated by the 2-dimensional image data (for example, D) of the other end when making an end into 2 criteria side-dimensional image data (for example, A) first, and only the number of the 2-dimensional image data which stands in a row in 2 criteria side-dimensional image data has a possibility that identity with the 2-dimensional image data when reading may be spoiled in it.

[0059] therefore, about 2-dimensional image data A which makes middle 2-dimensional image data (for example, B) the 2 criteria side-dimensional image data which edits first, and follows the left-hand side It edits by the above-mentioned edit side precedence mold left edit approach, and about the 2-dimensional image data C and D which follows right-hand side, it may edit by the above-mentioned edit side precedence mold right edit approach (it is called the edit side precedence mold both-directions edit approach), and all continuous 2-dimensional image data may be compounded. According to this edit side precedence mold both-directions edit approach, the count of edit repeated by the 2-dimensional image data of both ends can be reduced, and the identity of that image can be maintained.

[0060] Moreover, even if it is which these approaches, much edits are already performed and the 2 criteria side-dimensional image data set up after repeating edit in two or more duplication sections does not reproduce an image immediately after reading correctly. Therefore, the 2 edit side-dimensional image data edited so that it might be made in agreement without the 2 criteria side-dimensional image data and location gap will be further joined by the error by the edit till then.

[0061] Drawing 7 shows the gestalt of the operation from which this invention which solves this problem differs, and according to the gestalt of this operation, even if it repeats edit in two or more duplication sections, the 2 edit side-dimensional image data set up after that can be edited on the basis of the 2 criteria side-dimensional image data which always consists of non-edited 2-dimensional image data.

[0062] As shown in drawing, for example, if four 2-dimensional image data shall be compounded, first, 2 edit side-dimensional image data will be edited by making into 2 criteria side-dimensional image data 2-dimensional image data F connected with 2 edit side-dimensional image data on the right-hand in left end 2-dimensional image data E, and both will be compounded without a location gap. The edit approach is the same as the edit approach of description of setting the check area CH (K) as the duplication section, for example, the 1st edit indicated value about check area CH1EF from upper limit - Supposing it is x5 and y5 As shown in drawing 7 (a), in addition based on the edit indicated value y5, downward image data is caudad moved y5 from approximation area CH1' in pitches, such as Rhine n, from 2 edit side-dimensional image data [from upper limit to approximation area CH1'] E. Moreover, the whole 2 edit side-dimensional image data E is moved rightward xfive.

[0063] Edit same about all the check area CH (K) set as the duplication

section OEF is performed, and as shown in drawing 7 (b), the 2-dimensional image data E and F is compounded.
[0064] Then, 2 edit side-dimensional image data F is edited by making into new 2 criteria side-dimensional image data 2-dimensional image data G connected with 2 edit side-dimensional image data on the right-hand in 2-dimensional image data F which was 2 criteria side-dimensional image data. Edit of 2 edit side-dimensional image data F is performed also about all the 2-dimensional image data that stands in a row in coincidence at the 2 edit side-dimensional image data F side. That is, if edit indicated value edits 2 edit side-dimensional image data F by x6 and -y6 as shown in this drawing (c), it is edit indicated value. - Based on y6, Rhine n' is deleted from the 2 edit side-dimensional image data E and F, and 2 edit side-dimensional image data E and the whole F are moved to a left based on the edit indicated value x6.
[0065] Thus, after compounding the 2-dimensional image data F and G, edit is repeated by making into new 2 criteria side-dimensional image data 2-dimensional image data H which stands in a row on the right of compound 2-dimensional image data G as shown in this drawing (d).
[0066] The gestalt of this 2nd operation makes left end 2-dimensional image data E the 2 edit side-dimensional image data which edits first out of two or more 2-dimensional image data. the thing which shifts 2 edit side-dimensional image data to the method of the right one by one, and is made in agreement with the 2 criteria side-dimensional image data of the right-hand side -- it was (it is called the criteria side precedence mold right edit approach) -- For example, as 2 edit side-dimensional image data which edits right end 2-dimensional image data D first, 2 edit side-dimensional image data is shifted to the left one by one, and it may be made in agreement with the 2 criteria side-dimensional image data of the left-hand side (it is called the criteria side precedence mold left edit approach). Moreover, the criteria side precedence mold right edit approach and the criteria side precedence mold left edit approach as well as the above-mentioned edit side precedence mold edit approach may be used together by making into 2 edit side-dimensional image data the 2-dimensional image data which exists in the middle first.
[0067] Although normalization processing which makes in agreement Y lay length of two or more 2-dimensional image data read before edit was performed with the gestalt of the above operation, Y lay length is made in agreement and it is not necessary to necessarily compound between 2-dimensional image data.
[0068] Moreover, in the gestalt of the 2nd operation, although explained by the same synthetic approach, as long as the gestalt of the 1st and the 2nd operation is the approach of compounding between 2-dimensional image data without a location gap, it may be a synthetic approach by other approaches.
[0069]
[Effect of the Invention] As explained above, according to this invention,

each duplication section of two or more 2-dimensional image data is automatically compoundable without a location gap. Therefore, troublesome composition is lost and it can correct easily also about a minute location gap.

[0070] Moreover, since the 2 edit side-dimensional image data edited in the previous check area CH (K) is compared with 2 criteria side-dimensional image data according to invention of claim 2, the location gaps are fewer things. Therefore, the difference of the pixel data of the comparison pixel data DBx and y (i, j) and the criteria pixel data DA (i, j) serves as a small value, and count of the rates of concordance alphax and y becomes easy.

[0071] Since the 2-dimensional image data which follows 2 edit side-dimensional image data through other duplication sections is edited into coincidence according to invention of claim 3, the location gap between these 2-dimensional image data is not expanded by edit, and count of the rates of concordance alphax and y does not become complicated.

[0072] Moreover, since invention of claim 4 can always compare 2 edit side-dimensional image data with non-edited criteria side image data, where a photographic subject is resembled, it can compound composition of the duplication section.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view showing the 2-dimensional image data A, B, and C which continues in the duplication section.

[Drawing 2] It is the explanatory view showing the comparison pixel data DB (i, j) of the same part as the criteria pixel data DA of the part with which it is expressed by check area CH1AB of the duplication section OAB (i, j).

[Drawing 3] It is the explanatory view showing the relation between check area CH1AB and the set-up comparison area CHx and y (i, j).

[Drawing 4] It is the explanatory view showing the editing task of 2 edit side-dimensional image data B about the check area CH (K).

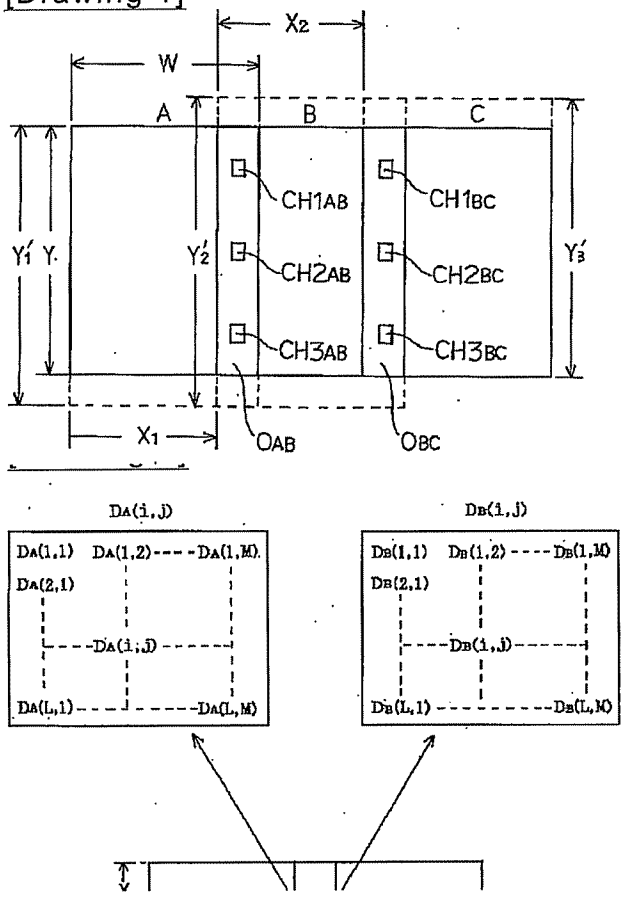
[Drawing 5] (a) in the edit side precedence mold right edit approach is an explanatory view in which (c) explains the editing task about check area CH3AB, and, as for (b), (d) explains the editing task about check area CH1BC for the editing task about check area CH2AB about the editing task about check area CH1AB.

[Drawing 6] It is the explanatory view showing the relation between check area CH2AB and the set-up comparison area CHx and y (i, j).

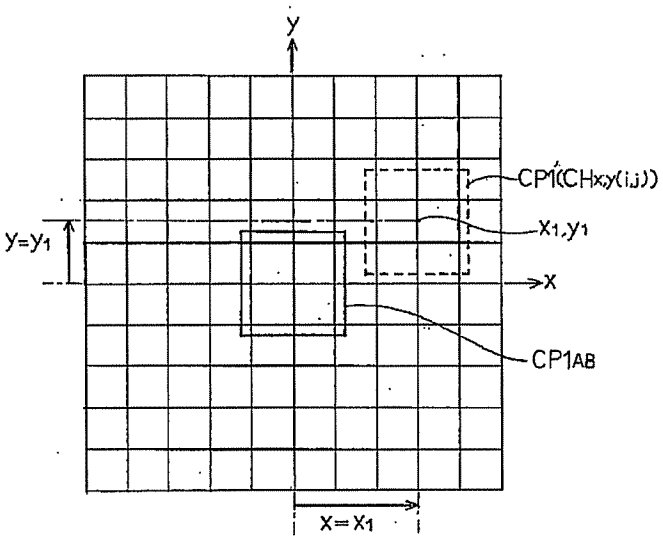
[Drawing 7] (b) is an explanatory view explaining the editing task to which (d) compounded the editing task about check area CH1FG for the editing task to which (a) in the criteria side precedence mold right edit approach compounded the editing task about check area CH1EF in the duplication section OEF in the duplication section OFG in (c).
[Drawing 8] It is the top view which removed covering of a handy scanner.
[Drawing 9] It is the top view showing how to read a photographic subject larger than the reading width of face w by the handy scanner.
[Drawing 10] It is the explanatory view showing the condition that two or more read 2-dimensional image data continued.
[Description of Notations]
1 Handy Scanner
5 Photographic Subject
CH Check area
CH (K) Kth check area
D (i, j) Criteria pixel data
CHx, y Comparison area
Dx, y (i, j) Comparison pixel data
alphax, y Rate of concordance
CH (K) ' Approximation area
deltax, delta y Edit indicated value
alphaMIN (K) The minimum rate-of-concordance value

DRAWINGS

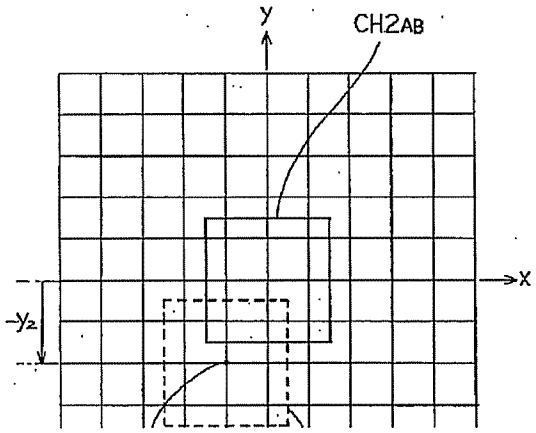
[Drawing 1]



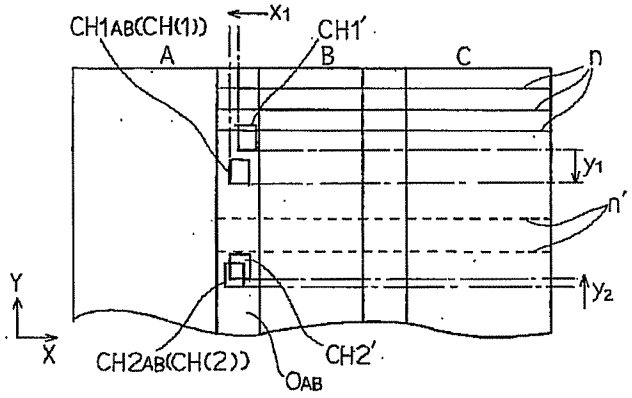
[Drawing 3]



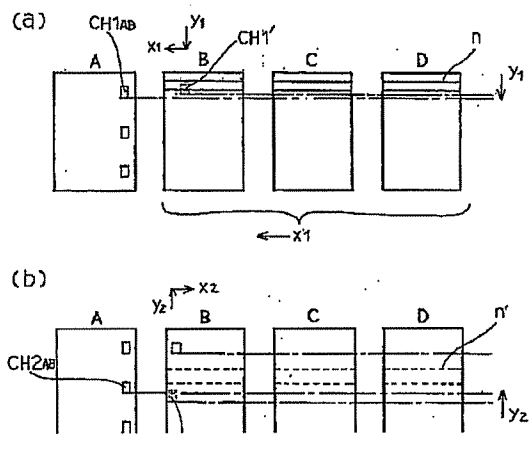
[Drawing 6]



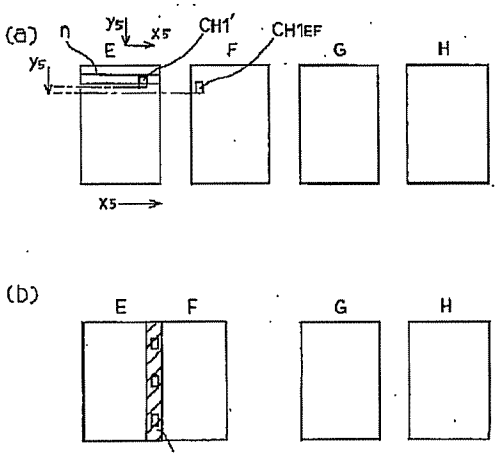
[Drawing 4]



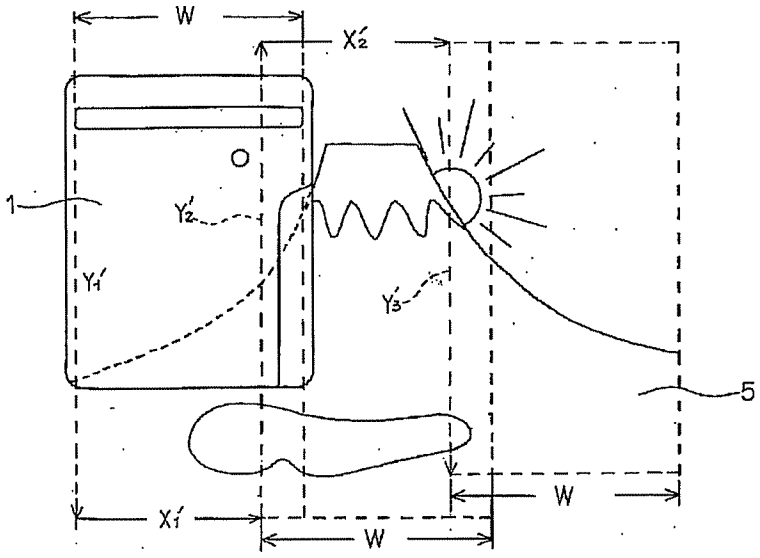
[Drawing 5]



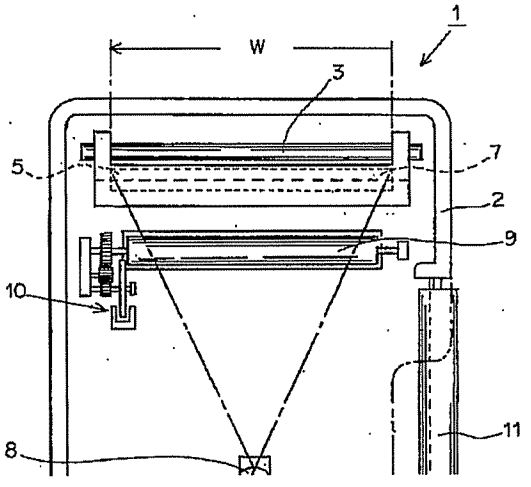
[Drawing 7]



[Drawing 9]



[Drawing 8]



[Drawing 10]